gradually or after a shut down the system would be restarted to run at a lower speed such as thirty thousand (30,000) or forty thousand (40,000) rpm to dissipate any heat remaining in the recuperator.

In most conventional systems, there would be a separate liquid fuel pump and a separate fuel metering valve. The system of the present invention eliminates the requirement for a separate metering valve. The helical flow pump can effectively serve both functions of flow control and pressure control. By combining the fuel pressure and fuel flow control in the helical flow pump, it is possible to maintain turbogenerator speed within plus or minus ten (10) rpm over a speed range of from approximately twenty four thousand (24,000) rpm to approximately ninety six thousand (96,000) rpm with a turbine exhaust gas temperature control within two (2) degrees Fahrenheit. By primarily setting up pressure control such that a very small change in turbogenerator speed makes a big change in flow the turbogenerator essentially stabilizes itself. Previous systems where the liquid fuel pump is run directly off the turbogenerator shaft with some kind of gear reduction, cannot even approximate this capability.

In previous systems, a flow control valve is then used to determine the liquid fuel flow to the combustor injectors. The flow control valve is usually computer controlled with the computer receiving information about turbogenerator speed, turbine exhaust gas temperature, and required turbogenerator power. The amount of liquid fuel flowing through the flow control valve would be a function of these three (3) parameters and their rate of change. This type of system is relatively complicated and is also a fairly large system.

On the other hand, the liquid fuel pressurization and control system and method of the present invention overcomes all of the above disadvantages of previous systems. It is not only relatively independent of load, but it does not require a speed sensor and is both stable and self-damping.

While specific embodiments of the invention have been illustrated and described, it is to be understood that these are provided by way of example only and that the invention is not to be construed as being limited thereto but only by the proper scope of the following claims.

What we claim is:

1. A method of liquid fuel pressurization and control for a turbogenerator supplied with liquid fuel by a pump disposed in a liquid fuel supply tank, comprising the steps of:

establishing the turbogenerator speed and turbogenerator turbine exhaust temperature required based upon the power load requirements of the turbogenerator;

establishing the liquid fuel pressure requirements to produce the established turbogenerator speed and operating temperature; and

commanding the pump to produce the established liquid fuel pressure by controlling the torque or speed of the pump in the liquid fuel supply tank.

2. A method of liquid fuel pressurization and control for a turbogenerator having liquid fuel supplied to a combustor through a plurality of air assisted liquid fuel injectors, comprising the steps of:

providing a compressor to further compress turbogenerator compressor discharge air;

establishing the turbogenerator speed required based upon the power load requirements of the turbogenerator;

establishing the air assisted injectors air flow requirements to match the established turbogenerator speed; and

commanding the compressor to produce the established air flow requirements by controlling the torque or speed of the compressor.

3. A method of liquid fuel pressurization and control for a turbogenerator having a combustor with a plurality of air assisted injectors supplied with liquid fuel by a pump disposed in a liquid fuel supply tank and with air assist air by a compressor to further compress turbogenerator compressor discharge air, comprising the steps of:

establishing the turbogenerator speed required based upon the power load requirements of the turbogenerator;

establishing the liquid fuel pressure requirements, combustion air flow requirements, and air assist air flow requirements to produce the established turbogenerator speed; and

commanding the pump to produce the established liquid fuel pressure requirements and the compressor to produce the established air assist air flow requirements by controlling the torque or speed of the pump and the compressor, respectively.

4. The method of claim 1 and the additional step of supplying the pressurized liquid fuel to the turbogenerator through a liquid fuel manifold to a plurality of liquid fuel injectors.

5. The method of claim 4 and the additional step of providing a liquid fuel control valve between the liquid fuel manifold and each except one of the plurality of liquid fuel injectors.

6. The method of claim 5 and the additional step of individually controlling the liquid fuel control valves open or closed.

7. The method of claim 5 and the additional step of modulating the liquid fuel control valves.

8. The method of claim 4 and the additional step of electrically driving the liquid fuel pump through an inverter.

9. The method of claim 2 and the additional step of electrically driving the compressor through an inverter.

10. The method of claim 9 and the additional step of atomizing the liquid fuel in the liquid fuel injectors with the further compressed turbogenerator compressor discharge air.

11. The method of claim 10 and the additional step of cooling the further compressed turbogenerator compressor discharge air before the air is supplied to the air assisted fuel injectors.

12. The method of claim 3 wherein the liquid fuel pump and compressor discharge air compressor are helical flow machines.

13. The method of claim 12 and the additional step of driving each of the helical flow machines by a separate permanent magnet motor.

14. The method of claim 13 wherein the helical flow liquid fuel pump shares a common shaft with one of the permanent magnet motors and the compressor discharge air compressor shares a common shaft with the other of the permanent magnet motors.

15. The method of claim 3 and the additional step of supplying the pressurized liquid fuel to the turbogenerator through a liquid fuel manifold to a plurality of liquid fuel injectors.

16. The method of claim 15 and the additional step of providing a liquid fuel control valve between the liquid fuel manifold and each except one of the plurality of liquid fuel injectors.

17. The method of claim 16 and the additional step of individually controlling the liquid fuel control valves open or closed.

18. The method of claim 16 and the additional step of modulating the liquid fuel control valves.

19. The method of claim 14 and the additional steps of electrically driving the liquid fuel pump through an inverter and of electrically driving the compressor through an inverter.

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